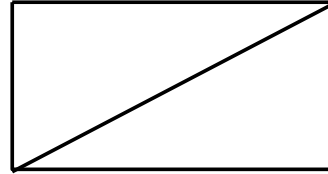
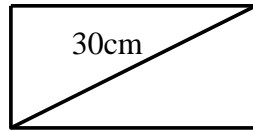


National 5

Homework RE19

1. The rectangles sketched below are mathematically similar and the area of the bigger rectangle is twice the area of the smaller rectangle.
The smaller rectangle has diagonal of length 30cm.
Calculate the length of the diagonal of the larger rectangle.

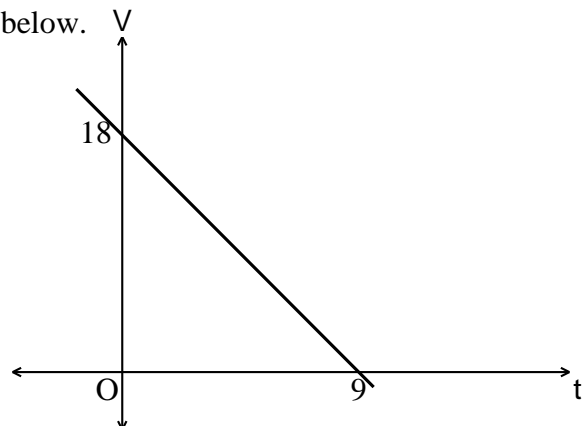


2. (a) Sketch the graph of $y = 3\cos 2x^\circ$, for $0 \leq x \leq 180$.
(b) Hence sketch the graph of $y = 2 + 3\cos 2x^\circ$, for $0 \leq x \leq 180$.
3. A conical pile of sawdust has radius 4 metres and height 3 metres.
If the sawdust fills a cubic container, calculate the length of the edge of the cube.
4. Solve
- (a) $15x^2 = 1 - 2x$ (b) $5x^2 + 3 = 8x - 1$

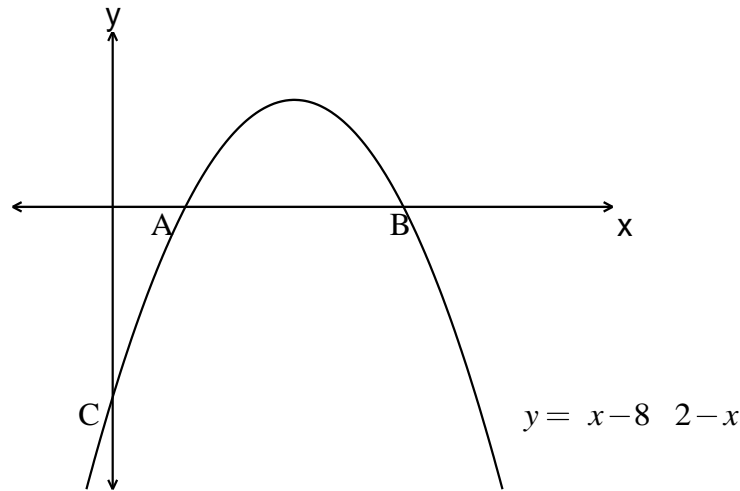
[Rearrange each equation into the "standard form" $ax^2 + bx + c = 0$ of a quadratic equation.]

5. (a) Express $x^2 + 6x + 13$ in the form $(x + a)^2 + b$.
(b) Hence sketch the graph of $y = x^2 + 6x + 13$.
6. (a) Solve $x^2 + 3x - 5 = 0$, giving the roots correct to 2 decimal places.
(b) Remove brackets and simplify $a^{\frac{1}{2}} \left(a + \frac{1}{a} \right)$.
(c) Express $\sqrt{128} - \sqrt{18}$ as a surd in its simplest form.
(d) $f(x) = x^{\frac{2}{3}}$. Evaluate $f(27)$.

7. Find the equation of the straight line sketched below.



8. (a) Evaluate $24 \cdot 7 - 0 \cdot 63 \times 30$
 (b) Factorise fully $5x^2 - 45$
 (c) $W = BH^2$. Change the subject to H .
 (d) Simplify $x^3 \times \sqrt{x}$
9. (a) In the graph below, find the coordinates of points A, B and C.



- (b) Find the coordinates of the maximum turning point of the above graph.
10. Simplify $\frac{\sqrt{3}}{\sqrt{24}}$, expressing your answer with a rational denominator.
11. The ratio of sugar to fruit in a particular jam is 5 : 4. It is decided to decrease the sugar content by 20% and increase the fruit content by 20%. Calculate the new ratio of sugar to fruit.
12. Expand and simplify:
- (a) $(x-2)(x^2 + 3x - 4)$ (b) $(x+1)^3$
13. Express in their simplest form:
- (a) $\sqrt{45} - 2\sqrt{5}$ (b) $\sqrt{2}(\sqrt{6} - \sqrt{2})$
14. Express in their simplest form:
- (a) $\frac{x^{-2} \times x^4}{x^{-1}}$ (b) $\frac{y^{\frac{1}{2}}(y^{\frac{3}{2}} + y^{-\frac{1}{2}})}{y}$